REMARKS/ARGUMENTS

This Amendment is in response to the Office Action mailed June 18, 2007. Claims 1, 3, 5-16, and 18-33 were pending in the present application. This Amendment amends claims 1, 15, and 29; and cancels claims 3-4 and 20-23; leaving pending in the application claims 1, 5-16, 18-19, and 24-33. Reconsideration of the rejected claims is respectfully requested.

I.   Rejection under §101

Claims 1, 3, 5-16, and 18-33 are rejected under 35 U.S.C. §101 as being directed to non-statutory subject matter. In particular, claim 1 (and the claims that depend therefrom) is rejected as reciting the term "allowing" instead of a positive recitation and for further reciting intended use language. This claim as amended no longer recites the rejected terminology, sets forth positive recitations, and recites positive steps including validating a design for the system. The process including the production of a validated design should thus produce a useful, concrete, and tangible result. Claims 15 and 29 as amended (and the claims that depend therefrom) recite such positive limitations and as such should produce a useful, concrete, and tangible result. Applicants therefore respectfully submit that the claims recite statutory subject matter and request that the rejections be withdrawn.

II.   Rejection under 35 U.S.C. §102

Claims 1, 3, 5-12, 14-16, 18-26, and 28-33 are rejected under 35 U.S.C. §102(b) as being anticipated by *Lin* (US 6,389,379). Applicants respectfully submit that *Lin* does not disclose each element of these claims.

For example, Applicants' claim 1 as amended recites a method in a hardware environment for validating a design for a system which comprises a software element and first and second hardware components, the software element being for execution on the second hardware component and the first and second hardware components being operable to interact with one another, the method comprising the steps of:

> simulating operation of the first hardware component in a first simulation in a hardware
> environment;

>   simulating the software element and the second hardware component in a second
> simulation using a software model embedded within the hardware environment;
>   **running the second simulation asynchronously with, and ahead of, the first
> simulation, the software model of the second simulation being synchronized with the first
> simulation using a reference clock parameter that limits a maximum number of processor
> clock periods of the second simulation per period of a reference clock of the hardware
> environment;**
>   **controlling the first simulation using the software model in the second simulation**
> that is running ahead of the first simulation, a socket allowing for communication between the
> software model and the first simulation; and
>   analyzing the first and second simulations and validating the design for the system,
>   wherein **the first simulation and the second simulation are implemented in separate
> processing threads within the hardware environment providing more rapid simulation of
> software instructions in the software model than the simulation of instructions in the first
> simulation**

(emphasis added). Such limitations are not disclosed by *Lin*.

Lin discloses a co-verification system including a reconfigurable computing system and
reconfigurable hardware array (col. 7, lines 61-67), which allow a user to turn designs into
hardware and software representations for simulation (col. 8, lines 1-4). While a simulation is
typically either software or hardware, the hardware simulation can be accelerated using the
software model and the software simulation can be accelerated using the hardware model (col. 8,
lines 4-44). The user then can run the software simulation and hardware emulations
concurrently, can switch between modes, and can stop either process at any time to inspect
values for each component (col. 28, lines 34-45). The software and hardware simulations can be
tied to the system clock (col. 8, line 45-col. 9, line 20).

Lin does not disclose a software model for the software simulation being embedded in the
hardware environment and running ahead of the hardware simulation, where the software model
controls the hardware simulation as recited in Applicants' claim 1 as amended. As recited in
claim 1, the software simulation is enabled to run more rapidly than the hardware simulation, but
a reference clock parameter is used that limits a maximum number of processor clock periods of
the software simulation per period of a reference clock of the hardware environment (see, for
example, page 3 lines 4-22 and page 7, line 6-page 8, line 35 for support). Such a limitation
allows the software simulation to run very quickly ahead of the hardware simulation, which is
particularly advantageous when executing large fragments of software on an embedded
processor without interaction with a PLD, for example, such as for running an operating system

application, while remaining being synchronized and avoiding getting undesirably ahead of the hardware simulation. *Lin* does not disclose the use of such a reference clock parameter, along with the resulting synchronization and control by the software model with respect to the hardware simulation. Further, *Lin* does not suggest or provide any motivation to provide such synchronization and control. As such, *Lin* cannot anticipate or render obvious Applicants' claim 1 as amended or the claims that depend therefrom. The other claims recite limitations that similarly are not disclosed or suggested by *Lin*, such that these claims also cannot be anticipated or rendered obvious.

Further, claim 15 recites using a debugger of the software model for such control and validation. Claim 29 recites running an interactive program in the terminal emulator to interact with, and transfer information to, the input/output device model, and polling the input/output device model for the transferred information using the software model in order to validate a design of the system, using a similar synchronization and control approach. *Lin* further does not teach or suggest these limitations in combination with limitations discussed above.

As *Lin* does not disclose, teach, or suggest such limitations, *Lin* cannot anticipate or render obvious these claims. Applicants therefore respectfully request that the rejections with respect to these claims be withdrawn.

III.   Rejection under 35 U.S.C. §103

Claims 13 and 27 are rejected under 35 U.S.C. §103(a) as being obvious over *Lin* in view of *Kim* ("An integrated Hardware-Software Cosimulation Environment with Automated Interface Generation"). Claim 13 depends from claim 1, and claim 27 depends from claim 15, which are not rendered obvious by *Lin* as discussed above. *Kim* does not make up for the deficiencies in *Lin* with respect to these claims. *Kim* teaches a co-simulation environment (Abstract; Introduction) and is cited as teaching use of a C model to implement a second simulation (OA p. 11). Even if the teachings of *Kim* were combined with those of *Lin*, the resultant combination would simply utilize a C model with the simulations of *Lin*, and would not teach or suggest a software model and software simulation being embedded in the hardware environment and running ahead of the hardware simulation, where the software model controls the hardware

Appl. No. 10/618,284
Amdt. dated October 17, 2007
Reply to Office Action of June 18, 2007

PATENT

simulation as recited in Applicants' claims as amended. Further as recited, the software simulation is enabled to run more rapidly than the hardware simulation, but a reference clock parameter limits a maximum number of processor clock periods of the software simulation per period of a reference clock of the hardware environment, allowing the software simulation to run very quickly ahead of the hardware simulation, while remaining being synchronized and avoiding getting undesirably ahead of the hardware simulation. As *Kim* does not teach or suggest such limitations, a combination with *Lin* would not arrive at such limitations, and as there is no motivation to provide such features, *Kim* cannot render obvious Applicants' claims 1 or 15, or dependent claims 13 and 27, either alone or in combination with *Lin*. Applicants therefore respectfully request that the §103 rejections with respect to claims 13 and 27 be withdrawn.

VI.   Amendment to the Claims

Unless otherwise specified or addressed in the remarks section, amendments to the claims are made for purposes of clarity, and are not intended to alter the scope of the claims or limit any equivalents thereof. The amendments are supported by the specification and do not add new matter.

Appl. No. 10/618,284
Amdt. dated October 17, 2007
Reply to Office Action of June 18, 2007

PATENT

CONCLUSION

In view of the foregoing, Applicants believe all claims now pending in this Application are in condition for allowance. The issuance of a formal Notice of Allowance at an early date is respectfully requested.

If the Examiner believes a telephone conference would expedite prosecution of this application, please telephone the undersigned at 415-576-0200.

Respectfully submitted,

Jason D. Lohr
Reg. No. 48,163

TOWNSEND and TOWNSEND and CREW LLP
Two Embarcadero Center, Eighth Floor
San Francisco, California 94111-3834
Tel: 415-576-0200
Fax: 415-576-0300
Attachment
JDL:slh
61174589 v1